REMARKS

In response to the official action:

[1-3] The Examiner's remarks are noted.

[4] The Examiner objects to the claims. The claims are amended and withdrawal of the objection is requested.

[5-6] Claims 1-3 and 7-9 are rejected under 35 U.S.C. §102(b) as being anticipated by Bruggeling (U.S. Patent 5,260,564). This rejection is respectfully traversed.

Bruggeling detects interruption of a light beam to determine when the edge of a moving sheet is present at a position (column 1, lines 9-11). As shown in Fig. 1, the detector has a light source 2 and a light detector 3 below the space 1 where the sheet travels, and a reflector 4A-4B above. The object of Bruggeling is to make the detector insensitive to lateral mis-adjustment between the reflector above, and the source/detector below (column 1, lines 25-38). To achieve this object, Bruggeling substitutes 60-degree reflectors for 45-degree reflectors (compare Fig. 2 to Fig. 1). .

The Examiner applies Fig. 4, showing a prism 26 different from that of Fig. 2. The Fig. 4 prism is described at column 5, lines 31-52.

As amended, claims 1, 4, and 7 recite that

the light guide is plate-shaped and comprises the reflection portion disposed on one of two opposing faces of the light guide having larger areas than the other faces thereof, and the light guide takes in the light through one end face thereof, reflects the taken-in light at the reflection portion, and ejects the reflected light from the other of the two opposing faces thereof.

The Examiner asserts that faces 27, 28, and 29 of Bruggeling's "prism" (column 5, line 26) comprise a reflection face, but these faces are not coplanar and therefore they cannot be the two opposing faces of a "plate-shaped" light guide which are larger in area than the other faces, as is claimed. The Examiner will appreciate that a plate inherently has two largest sides, which are opposed and also generally parallel to one another (parallelism is specifically claimed in new claims 20-22); if the two opposing large sides are not parallel, then the shape is a "wedge" or a "prism" and not a "plate." The Random House dictionary defines "plate" as "a thin, flat sheet or piece of metal or other material, esp. of uniform thickness." Uniform thickness is equivalent to the two large sides being parallel.

In Fig. 4 of Bruggeling, the light enters the prism through the un-numbered lower face, so that face must correspond to the claimed end face if Fig. were to 4 anticipate (not admitted); the light is reflected internally at faces 27, 28, and 29, so at least one of those faces would need to correspond to the claimed reflection portion, which is on one of the two large sides; but the light also leaves through the un-numbered lower face, which is not an opposing plate face of any of the faces 27, 28, or 29. With respect, the faces of Bruggeling cannot be matched with the Applicant's claimed faces. Neither are any two of Bruggeling's prism faces parallel.

Claims 3 and 9 now recite a series of parallel grooves, which are not at all disclosed by Bruggeling.

[7] Claim 4 is rejected under 35 U.S.C. §102(b) as being anticipated by Ohtomo (U.S. Patent 5,907,907). This rejection is respectfully traversed.

Ohtomo shows a device with a rotating reflector that scans a laser beam around in a circle. In applied Fig. 3, the beam from laser diode 25 is deflected by a pentagonal prism 44, is reflected by a remote mirror 47. Mirror 47 is retro-reflective, as described starting at column 5, line 51, so that it will return the laser beam without being aligned (column 6, line 7).

With respect, claim 4 includes the claim language quoted at the top of page 7 above, and the prism of Ohtomo does not anticipate that language, for the same reasons as set out above. The reflection faces and exit face are not parallel and there is no plate shape, as claimed.

Moreover, the claimed feature, that the "position of said reflective object is detected based on the light received by the light receiver," is not disclosed. The Ohtomo device detects a center line of the reflective object; as is explained at column 7, lines 22-44, the relative polarization of the returned scanned beam depends on where the impinging beam hits the reflector 47. The Examiner is referred to Fig. 12, showing how the plane defined by the beam scan can be adjusted to the center mark 87 of the reflector 47 by rotating the unit 1, around a vertical axis, until the polarization ratio is correct. The alignment of the reflector 47 to the plane of the beam scanning is detected, but neither the distance nor the azimuth are detected. The Applicant respectfully questions whether "position" is disclosed.

[8] Claims 4-6 are rejected under 35 U.S.C. §102(b) as being anticipated by Sick (U.S. Patent 4,085,322). This rejection is respectfully traversed.

In Fig. 1 and Fig. 2 (Fig. 2 is a cross section of Fig. 1), Sick shows a device for analyzing light reflected from the surface of a paper or fabric web, to find defects in the web; a laser (not shown) scans over the web 11 (column 1, lines 8-10). The laser beam illuminates a series of spots 24, 24', 24", and the light that is reflected and scattered from the web 11 passes through a pair of cylinder lenses 23 into a transparent rectangular rod 12, where the light is internally reflected to second lens 16 and photoelectric cells 19.

At column 1, line 54, Sick explains that "in the case of a completely satisfactory surface light that is reflected ... at a right angle ... is combined in the focus [26 in Fig. 1] of the lens [16 in Fig. 1]." The beams reflected from surface 11 at right angles are all parallel, and therefore are focused to a single point by the lens 16. This is illustrated in Fig. 1.

Sick continues at column 1, line 57, "Light diverging from this normal [right angle] direction at any [other] angle is also concentrated in the focal plane but at a point which is laterally displaced." At column 3, line 64, Sick explains additionally, "As shown in Fig. 1, lens 16 also combines in focal plane 18 at points located adjacent focal points 26 those light beams 13 which do not emanate from surface 11 at right angles."

The light arriving at the focal plane, whether or not leaving the surface 11 at a right angle, is registered by light detectors 19 (also shown in Fig. 3). At column 4, line 23, Sick states, "The electric signals generated by the individual photoelectric cells [19] are a measure [of] light emanating from surface 11 at a particular angle." Thus, irregularities in the surface 11 can be detected by variation of the signals from the light detectors 19 (also shown in Fig. 3).

The rejection is respectfully traversed on the following bases:

(1) The "rod" 12, which is the only element of Sick that could correspond to the claimed light guide, is not plate-shaped; it is rod-shaped.

(2) Fig. 2 shows that there are no faces with areas larger than the other faces, as the cross section is square and all the faces are the same in area (except the ends not shown in Fig. 2). There are not "two opposing faces of the light guide having larger areas," as claimed.

(3) No matter which of the faces in Fig. 2 might be (incorrectly) equated to the larger-area face, only the sides shown in Fig. 2 might even be candidates for that, because the ends are of course smaller in area. However, the light enters from the bottom, so the bottom would need to correspond to the claimed "one end face." Therefore the bottom cannot be one of the "two opposing faces."

(3) The light leaves from the end of the rod 12, which implies that the end must correspond to the claimed "other of the two opposing faces thereof," but it does not oppose any of the sides shown in Fig. 2. Therefore such correspondence is contrary to the other assumptions that must be made if there were to be any anticipation (not admitted).

(4) As with Ohtomo, Sick arguably does not determine the position of a reflective object (presumeably, the defect). The Applicant sees no disclosure of any connection between the scanning laser and the device analyzing the outputs of the cells 19, which would allow position to be determined. Assuming that there were a connection between the scanning laser and the device analyzing the outputs of the cells 19, this would most likely only determine the location of a defect in the direction of web travel ("f" in Fig. 2) and not in the direction of laser beam scanning ("F" in Fig. 1; see column 3, lines 34-44). Because the purpose is to monitor the quality of a

web, there would be no need to localize a defect in the scanning direction, since a defective portion of the web would be removed by cuts made along the scanning direction.

In view of the aforementioned amendments and accompanying remarks, the claims are believed to be in condition for allowance. Withdrawal of the rejection and allowance of all claims is requested.

Respectfully submitted,

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